Evaluation of the CCNR Questionnaire

Introduction of Inland AIS and Electronic Chart Display Systems on the river Rhine

CCNR Workshop, November 17th 2017

Alaric Blakeway, Stefan Bober
• Introduction of Inland AIS by several European subsidy programs

• December 1\textsuperscript{st} 2014: CCNR carriage requirement for Inland AIS and Inland ECDIS or comparable electronic chart display device

• Winter 2016/2017: CCNR questionnaire regarding the introduction of these requirements

• November-December 2016: Questionnaire published on CCNR website and promoted by VNF, BTB, WSV and Port of Basel

• Specific questionnaires for Skippers, Installation Companies, Waterway Administrations, Waterway Police / Enforcement

• Up to 80 questions, partly further detailed

→ a big thank you to all the contributors who filled in the questionnaires
<table>
<thead>
<tr>
<th>Target group</th>
<th>Number of use reactions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skippers</td>
<td>1203</td>
</tr>
<tr>
<td>Fairway Authorities</td>
<td>43</td>
</tr>
<tr>
<td>Enforcement and Police services</td>
<td>19</td>
</tr>
<tr>
<td>Installation companies</td>
<td>50</td>
</tr>
</tbody>
</table>

Responses:
- 1203 Skippers
- 43 Administrations
- 50 Installation companies
- 19 Police services
- ?
Who did respond?

→ 1203 skippers
  • sailing on the river Rhine
    as well as in the CCNR Countries
  • cargo vessels, tankers, passenger vessels

→ 50 out of 100 installation companies

→ Police and authorities
  • NL, F, CH, DE
  • RIS centers, lock keepers, port authorities, administrations

Number of skippers that have responded

Do you sail in these areas?
(multiple answers are possible)
Representativeness

\[ n = \frac{N \cdot Z^2 \cdot p(1-p)}{Z^2 \cdot p(1-p) + (N-1) \cdot F^2} \]

- Population = N
- % of failure = F
- Spread = p
- Response = n
- Reliability = Z

• Questionnaire for skippers

\[ n = \frac{8000 \cdot (1,96)^2 \cdot 50 \cdot 50}{1,96^2 \cdot 50 \cdot 50 + 7999 \cdot 5^2} \]

= 366,1 => 1023 responses min. (1203 received)

• Questionnaire for installation companies

\[ n = \frac{111 \cdot (1,96)^2 \cdot 50 \cdot 50}{1,96^2 \cdot 50 \cdot 50 + 110 \cdot 5^2} \times \sqrt{\frac{111-87}{87-1}} \]

= 24,1 => 50 responses min. (50 received)

Free text / comments
Additional written comments to some questions were possible
Several questions got many comments
The number of comments per question are categorized:
6 categories: from very few (<5) to extensive (> 101)
02 GENERAL OVERVIEW
General opinion of the skippers

Most skippers have become familiar with the equipment:

- majority of problems resolved
- satisfied with the system
- could not do without it any more

However Inland AIS
- is intended for navigational information
- is not a navigation system
- has limitations, can be wrong or can fail (not 100% reliable)

→ Inland AIS does not replace visual observation, radar or VHF radio
Combination of Inland AIS and electronic chart display system

The system makes a significant contribution to improved safety:
• clear image of the location
• provides name and speed
• excellent aid to navigation
• enables to see
  - far ahead
  - round a bend
  - behind an obstacle

Efficiency / protection of environment:
• advantages for lock planning
• particularly fuel saving and environmental considerations
Combination of Inland AIS and electronic chart display system

Danger of relying too much on the equipment:
- using it like a kind of radar
- hardly looking through the window
- assuming that one will be seen
- assuming nothing on the display = nothing ahead

However:
- AIS is not 100% reliable
- not all vessels are equipped
The use of the VHF

With AIS, skippers know in advance which vessels they’ll encounter, and can contact the vessels via VHF
• arrangements for overtaking
• arrangements to pass each-other

However, decrease in use of VHF:
• Skippers assume
  • they see all vessels on the screen
  • all vessels see them on the screen
• Less notification of other vessels leaving ports or in narrow sections
• Less agreement on how to proceed in situations with poor visibility or in bends
03

EXPERIENCE ON BOARD
Installation of the equipment

Inland AIS:
• 61.9% got instructions by the installer on the use of the Inland AIS device
• 33.3% received no instruction
• 4.8% were informed in different ways

Electronic chart display system:
• 45.4% got instructions on the use of the electronic chart display system
• 44.2% received no instruction
• 10.3% were informed in different ways

• 86.9% received a certificate after installation
• 87.5% have a user manual of the systems on board

Installation companies

What is your experience regarding giving initial instruction to skippers on the use of the Inland AIS device on board their vessels?

- The skipper is interested
- The skipper is not interested
- The skipper doesn't follow the instructions

Do other members of the staff/crew take part on the training?

- Allways
- Regularly
- Sometimes
- Seldom
- Never
Use of an electronic chart display system on board

Electronic chart display systems are:
• in majority Inland ECDIS systems
• 3,4% open source
• 12,3 % other systems

<table>
<thead>
<tr>
<th>Use</th>
<th>Number of respondents</th>
<th>percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information mode</td>
<td>765</td>
<td>85,3 %</td>
</tr>
<tr>
<td>Navigation mode</td>
<td>37</td>
<td>4,1 %</td>
</tr>
<tr>
<td>Both modes</td>
<td>95</td>
<td>10,6 %</td>
</tr>
</tbody>
</table>
Setting of the Navigation Status

Adjusting the navigation status is not self-evident:
- unnecessary and pointless
- obvious, from the speed, whether a vessel is sailing or at anchor
- should be generated automatically

Update method:
- 40% with the Inland AIS device
- 55% with the electronic chart display system

When do you change your setting "Navigation status"?

<table>
<thead>
<tr>
<th>Changing the Status</th>
<th>Number of respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Always</td>
<td>138</td>
<td>13,2 %</td>
</tr>
<tr>
<td>I sometimes forgot it</td>
<td>190</td>
<td>18,2 %</td>
</tr>
<tr>
<td>Sometimes</td>
<td>139</td>
<td>13,2 %</td>
</tr>
<tr>
<td>Never</td>
<td>579</td>
<td>55,4 %</td>
</tr>
</tbody>
</table>
Checking if the Inland AIS information is transmitted

Regular check if the Inland AIS device is transmitting the correct data is required

It seems not obvious how to do this

Skippers often inform each other when the Inland AIS device is transmitting incorrect data

How often do you check the information that is transmitted by your Inland AIS device?

- Never: 38
- Very seldom: 242
- Seldom: 280
- Often: 196
- Always: 269

How do you check if your Inland AIS device is transmitting the correct information?

- I ask a colleague: 301
- I ask the traffic centre: 132
- I don't check, because I don't have easily access to my own information: 235
- I use a website (e.g. Marine Traffic) to check my information: 143
- Other: 212
Data broadcasted by the onboard Inland AIS station

Most skippers agree with the required data to be transmitted

However it can be difficult to change this data

Displaying all data may lead to a very crowded display, especially in ports or busy areas

Names should be given without prefixes (e.g. without MV)

Which Inland AIS information is the most important for you and other users of the fairway?

Which extra information do you transmit with your Inland AIS device?
Quality of the electronic chart displayed on board

Critical comments regarding the electronic navigation charts:

- many out-of-date
- contain lots of errors
- information is missing
  e.g. water depth, navigation channel

Proposals:

- charts renewed more often
- more interim updates
- greater degree of uniformity of symbols, in particular types of vessel
- distinction between commercial vessels and recreational craft
Quality of information

- 58.3% skippers: are never warned that their AIS signal is incorrect
- police and authorities: not all skippers can correct the data immediately - sometimes due to the missing manual
- some skippers suggest an (acoustic) alarm

How often are you informed that your AIS information is not correct?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Number of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
<td>598</td>
</tr>
<tr>
<td>&lt; once a month</td>
<td>36</td>
</tr>
<tr>
<td>Once a month</td>
<td>2</td>
</tr>
<tr>
<td>On weekly basis</td>
<td>63</td>
</tr>
<tr>
<td>On daily basis</td>
<td>21</td>
</tr>
<tr>
<td>Other</td>
<td>3</td>
</tr>
</tbody>
</table>

What data are the most frequently badly configured?

<table>
<thead>
<tr>
<th>Data</th>
<th>Number of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vessel name</td>
<td>3</td>
</tr>
<tr>
<td>ENI/OMI</td>
<td>4</td>
</tr>
<tr>
<td>Dimensions</td>
<td>9</td>
</tr>
<tr>
<td>Navigation...</td>
<td>8</td>
</tr>
<tr>
<td>Vessel type</td>
<td>3</td>
</tr>
</tbody>
</table>

Police: Vessels with broken down Inland AIS device

<table>
<thead>
<tr>
<th>Number of Services</th>
<th>Vessels noticed</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>1</td>
<td>15</td>
</tr>
<tr>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td>1</td>
<td>50</td>
</tr>
</tbody>
</table>
04 TECHNICAL ISSUES
Technical problems with the inland AIS device

Unexpected high number of technical problems
• 54.2% (562 skippers) had some technical problems
• 45.8% (474 skippers) had no technical problem

57.1% of the problems fixed by the installer
• breakdown of the Inland AIS
• antenna problems
• vessels ‘frozen’ on the chart
• interference with TV

A regular reset of the device is not a solution

Some problems are not yet identified
• areas (black spots) where no AIS signal is visible → needs further investigation

<table>
<thead>
<tr>
<th>Number of respondents</th>
<th>Number of breakdowns</th>
</tr>
</thead>
<tbody>
<tr>
<td>101</td>
<td>1</td>
</tr>
<tr>
<td>82</td>
<td>2-5</td>
</tr>
<tr>
<td>11</td>
<td>6-10</td>
</tr>
<tr>
<td>9</td>
<td>&gt;10</td>
</tr>
</tbody>
</table>
Technical problems with the Electronic chart display systems

- 34,0% (302 skippers) had some technical problems
- 66,0% (585 skippers) had no technical problems

24,0% of the problems fixed by the installer
- outdated software (e.g. Window XP)
- outdated computers
- connection problems computer<->AIS
- computers crashing
- cables are often a problem
- application software not always good

What was the reason for the technical problem?

<table>
<thead>
<tr>
<th>Reason</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>System broke down</td>
<td>78</td>
</tr>
<tr>
<td>Certain geographic areas</td>
<td>53</td>
</tr>
<tr>
<td>Radio inferences</td>
<td>44</td>
</tr>
<tr>
<td>Computer problems</td>
<td>43</td>
</tr>
<tr>
<td>GPS problems</td>
<td>14</td>
</tr>
<tr>
<td>I do not know why</td>
<td>8</td>
</tr>
</tbody>
</table>

Number of respondents | Number of breakdowns
----------------------|---------------------
59                    | 1                   
152                   | 2-5                 
37                    | 6-10                
17                    | 11-20               
35                    | >20                 

24% of the problems fixed by the installer.
**Installation of Inland AIS**

49 companies indicated the number of Inland AIS devices they repaired or replaced.

Problems during the installation and configuration:
- 16% indicate problems during installation.
- 10% indicate problems during configuration including firmware updates.

Use of CCNR Installation guidelines:
- 78% know the CCNR Installation guidelines.
- 68% use the checklist included in the guidelines.
- 32% use their own or manufacturer's checklist.

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<table>
<thead>
<tr>
<th>Number of companies</th>
<th>Number of repairs/replacements</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>1</td>
<td>18</td>
</tr>
<tr>
<td>1</td>
<td>20</td>
</tr>
<tr>
<td>4</td>
<td>25</td>
</tr>
<tr>
<td>1</td>
<td>30</td>
</tr>
<tr>
<td>1</td>
<td>35</td>
</tr>
<tr>
<td>3</td>
<td>50</td>
</tr>
<tr>
<td>1</td>
<td>55</td>
</tr>
<tr>
<td>1</td>
<td>96</td>
</tr>
</tbody>
</table>

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Did you install a second Inland AIS device for redundancy?

- Yes. The second AIS device is ready for operation, 11.
- Yes. The second AIS device has to be configured, 28.
- No, 11.

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23
Delay necessary to repair

**Skippers:**
The deadline of 48 hours too short and particularly difficult on weekends

Specialist repair companies cannot always guarantee to get to a location within 48 hours

**Time to repair the Inland AIS device**

<table>
<thead>
<tr>
<th>Time needed to repair</th>
<th>Number of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤48 hrs</td>
<td>147</td>
</tr>
<tr>
<td>48 – 72 hrs</td>
<td>36</td>
</tr>
<tr>
<td>72 – 96 hrs</td>
<td>21</td>
</tr>
<tr>
<td>≥96 hrs</td>
<td>102</td>
</tr>
</tbody>
</table>

**Time to repair Electronic chart display system**

<table>
<thead>
<tr>
<th>Time needed to repair</th>
<th>Number of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤48 hrs</td>
<td>152</td>
</tr>
<tr>
<td>48 – 72 hrs</td>
<td>17</td>
</tr>
<tr>
<td>72 – 96 hrs</td>
<td>13</td>
</tr>
<tr>
<td>≥96 hrs</td>
<td>30</td>
</tr>
</tbody>
</table>

**Installers:**
42 % installers could not keep time limit (48 h)
58 % had no problems to keep the time limit

**What is the average time to repair an Inland AIS device so that it sends its radio signal again (including your travel time)?**

- < 0.5 day: 9 respondents
- < 1 day: 8 respondents
- < 2 days: 12 respondents
- > 2 days: 13 respondents

**Authorities and police services:**
In majority agree with the 48 h time limit for repair
05 PRIVACY
Privacy aspects
Main concerns of skippers:

AIS websites

Violation of privacy and control by authorities

Competition clause

Criminal abuse such as burglary

Promises of government organisations

Misuse by shippers and freight companies
06 FURTHER STEPS
Further steps:

• One document = results + conclusions + recommendations?

• Too much information → split the work in two phases:
  • Report A = results of the questionnaire
  • Report B = conclusions and recommendation

• Report A:
  • adoption by CCNR plenary session December 6th 2017

• Report B:
  • under way
  • first draft available for discussion
  • probably adoption by plenary session in spring 2018
THANK YOU FOR YOUR ATTENTION